Amendments to the Drawings

Fig. 3A has been amended to correct a typographical error. Specifically, the reference label "40" has been amended to "140" as is in accordance with the written description.

Attachment: Replacement Sheet
Annotated Marked-Up Drawings

REMARKS

The remainder of this amendment is set forth under appropriate subheadings for the convenience of the Examiner.

Status of Application

In response to the Office Action mailed July 29, 2008, Applicant respectfully requests reconsideration. Claims 1-21 were previously pending in this application. No claims have been amended or canceled, and no new claims have been added.

Summary of Advantages of Applicant's Invention

An example of one advantage of Applicant's invention is described below to highlight some aspects of the invention. This advantage is described primarily in Applicant's specification at page 4, lines 7-13; page 5, lines 15-24; page 5 line 28 through page 6, line 6; and Figures 1, 3A, 4, and 6. It should be appreciated that the description below is merely an example of one of many embodiments that fall within the scope of Applicant's claims and is provided for the purpose of highlighting some aspects of Applicant's invention.

Fig. 1 illustrates a prior art data scanner 50 that may be utilized in a liquid crystal display. The data scanner 50 may feature a number of digital-to-analog converters 140 (DAC) used to convert a received digital signal to an analog signal (page 4, lines 7-13). Fig. 3A provides a detailed representation of the DAC 140 of Fig. 1. Numerous problems arise when using DACs 140. First, the capacitors 330 and 340 of the DACs 140 must be well-matched for predictable charge sharing. Second, it is hard to integrate DACs 140 on fine pitch column lines 135 because more area is needed for well-matched DAC capacitors 330 and 340. Third, it is hard to integrate numerous amplifiers 150 (Fig. 1) on the liquid crystal display because the amplifiers 150 need to be low power, have good matching, and be integrated with fine pitch column lines (page 5, lines 15-24).

The problems highlighted above may be alleviated by replacing the DACs 140 and amplifiers 150 with a switching network 410, as is shown in Fig. 4, and as employed by Applicant's data scanner and method, as is claimed in Claims 1-21. Fig. 6 provides a detailed representation of the switching network 410. One point of contrast between the DACs 140 and

the switching network 410 is that the switching network 410 utilizes column line capacitances 160 to convert the digital signals to analog signals. Specifically, the switching network 410 (see Fig. 6) does not include any capacitor elements, unlike the DAC (see Fig. 3A) of the prior art. Instead, Applicant's claimed data scanner and method employs a capacitance provided to the switching network 410 via the column load capacitances 160, which is supplied by a pair of column lines 135 (page 5, line 28 – page 6, line 6).

Rejection of Claims 1, 10, and 21 Under 35 U.S.C. §103

The Examiner rejects Claims 1, 10, and 21 under 35 U.S.C. §103(a) as being unpatentable over what the Examiner characterizes as Applicant's admitted prior art "(APA)" in view of Jenssen *et al.*, U.S. Patent Application No. 2002/0135557 (Jenssen). Applicant respectfully traverses this rejection. The Examiner asserts the APA teaches the elements of Claim 1 with the exception the italicized element. The Examiner further asserts that Jenssen teaches the italicized element and that it would have been obvious for one of skill in the art to use the teachings of Jenssen in the device of the APA in order to provide a means to distribute analog signals down separated column lines. Applicant respectfully disagrees.

APA illustrates prior art methods of digital-to-analog conversion in liquid crystal displays (LCD). Fig. 1, which is included in the detailed description of Applicant's specification, provides an illustrative example of the art discussed in the APA. A number of digital-to-analog converters (DAC) 140 are used to convert received digital signals to analog signals. As shown in Fig. 4, the DAC 140 may utilize capacitors 330 and 340 to aid in the digital-to-analog conversion. Once a signal has been converted, the converted signal is passed through an amplifier 150. The amplified signal is then applied to individual column load capacitances 160 (page 4, lines 7-19).

Jenssen illustrates a column-driving circuit configured to reduce capacitive loads on individual columns ([0002]). In Fig. 3 (relied upon by the Examiner) a column-driving circuit 60 is provided. The circuit 60 includes three DACs 68, 70, and 72 configured to receive and convert digital signals 62, 64, and 66, respectively, to analog signals. After the signals have been converted, the analog signals are passed through individual multiplexer circuits 74, 76, and 78. Fig. 5 of Jenssen provides a detailed illustration of the DAC and multiplexer combination. Note

that the DAC 68 is separate from the column lines 80A and 80B. Therefore, the DAC is not in direct connection with, nor does it utilize, the column line capacitance. The multiplexer circuit alternates the received analog signal between column line 80A and 80B. While one column is receiving the analog signal, the other will receive a reference voltage 112 ([0033]).

Applicant's Claim 1 recites "A data scanner for driving a liquid crystal display (LCD), comprising: a data bus, the data bus containing digital data; a row buffer coupled to the data bus for receiving and distributing the digital data received from the data bus; and a switch network coupled to the row buffer, the switch network *converting digital data received from the row buffer to analog data using column load capacitances on pairs of column lines of the LCD.*" (Emphasis added). Similarly, the subject matter of independent Claim 10 includes the italicized element of Claim 1.

Neither the APA nor Jenssen, taken individually or in any combination, teach converting a digital signal to an analog signal *using column load capacitances* on pairs of column lines, as is recited in independent Claims 1 and 10. Instead, the APA relies on internal capacitors 330 and 340 in the conversion of digital signals. The conversion of Jenssen to an analog signal takes place in a DAC which is not in immediate connection with the column line. Therefore, neither the APA nor Jenssen utilizes load capacitances to connect digital data to analog data as claimed by Applicant.

Independent Claims 1 and 10 are patentably distinct from the combination of the APA and Jenssen. Dependent Claim 21 depends from Claim 1 and, therefore also is patentably distinct from the combination of the APA and Jenssen for at least the same reasons.

Rejection of Claims 2-8 , 11-17, 19, and 20 Under 35 U.S.C. §103

The Examiner also rejects Claims 2-8, 11-17, 19, and 20 under 35 U.S.C. §103(a) as being unpatentable over APA in view of Jenssen and further in view of Edwards *et al.*, U.S. Patent Application No. 2002/0054005 (Edwards). Regarding Claims 2 and 11, the Examiner concedes that the combination of the APA and Jenssen fails to teach a switch network coupled to the row buffer. However, the Examiner asserts that Edwards teaches this element and that it would have been obvious for one of skill in the art to use the teachings of Edwards in the combined device of the APA and Jenssen in order to put in place a switching means to direct the

image signals to the desired column lines. Regarding Claims 3 and 13, the Examiner asserts that Edwards further teaches a switching device including a logic circuit. Regarding Claims 4-6 and 13-15, the Examiner asserts that Edwards further teaches the use of MOSFETs which are n-channel MOSFETs, MOSFETs which are p-channel, or MOSFETs which are a combination of n-channel and p-channel MOSFETs. Regarding Claims 7 and 16, the Examiner asserts that Jenssen further teaches a data scanner where a column line pair is coupled to alternating pixels. Regarding Claims 8 and 17, the Examiner asserts that Jenssen teaches a data scanner where the pixels are arranged in a rectangular layout. Regarding Claims 19 and 20, the Examiner asserts that Jenssen teaches a switching network converting digital data received from a row buffer to analog data using column load capacitances on pairs of column lines of the LCD.

Regardless of whether or not Edwards and/or Jenssen provide the teachings asserted above by the Examiner, the cited references fail to remedy the deficiencies of the APA and Jenssen combination described above. Specifically, no combination of the APA, Jenssen, and Edwards teach converting a digital signal to an analog signal *using column load capacitances* on pairs of column lines, as is recited in independent Claims 1 and 10.

Claims 2-8 and 19 depend from Claim 1 and Claims 11-17 and 20 depend from Claim 10. Thus, Claims 2-8, 11-17, 19, and 20 are patentably distinct over the combination of the APA, Jenssen, and Edwards for at least the same reasons as Claims 1 and 10.

Rejection of Claims 9-18 Under 35 U.S.C. §103

The Office Action further rejects Claims 9-18 under 35 U.S.C. §103(a) as being unpatentable over APA in view of Jenssen and further in view of Hashimoto, U.S. Patent No. 5,619,225 (Hashimoto). The Examiner concedes that the combination of the APA and Jenssen fails to teach a data scanner featuring pixels arranged in a rectangular layout. However, the Examiner asserts that Hashimoto teaches this element and that it would have been obvious to one of skill in the art to use the teachings of Hashimoto in the device of the APA and Jenssen combination in order to produce a LCD with improved horizontal and vertical resolutions.

Regardless of whether or not Hashimoto provides the asserted teachings, Hashimoto fails to remedy the deficiencies found in the APA and Jenssen combination. Specifically, no combination of the APA, Jenssen, and Hashimoto teach converting a digital signal to an analog

signal *using column load capacitances* on pairs of column lines, as is recited in independent Claims 1 and 10.

Claim 9 depends from Claim 1 and Claim 18 depends from Claim 10. Therefore, Claims 9 and 18 are patentably distinct over any combination of the APA, Jenssen, and Hashimoto for at least the reasons as Claims 1 and 10.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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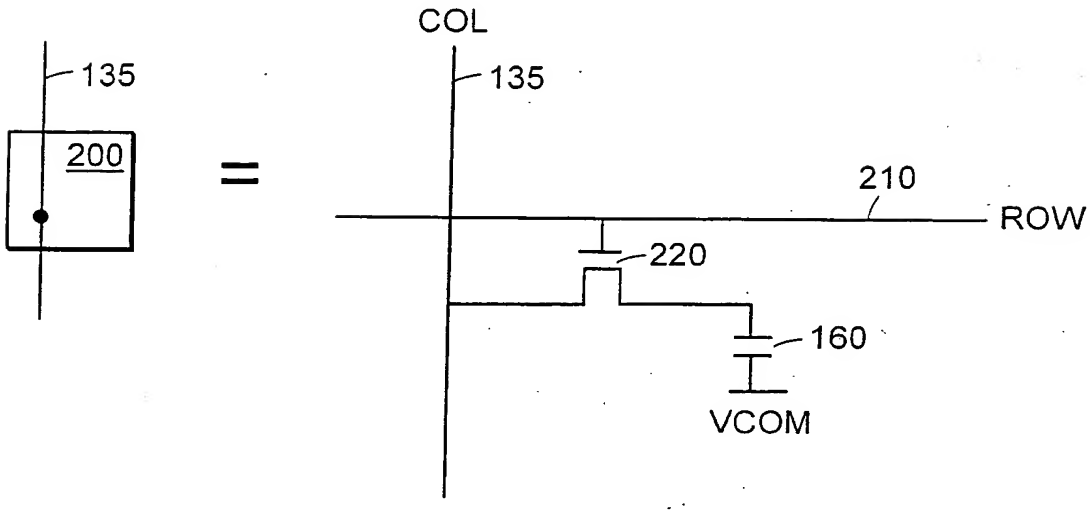
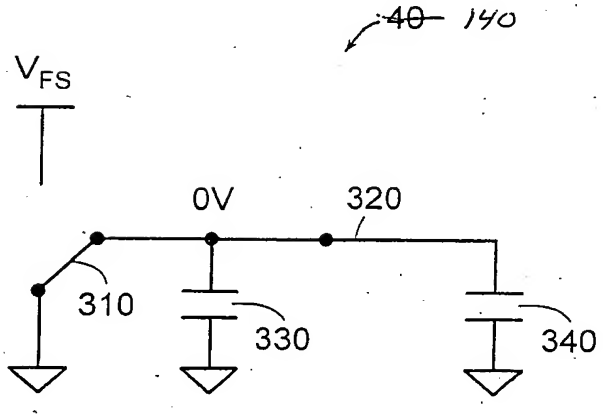


FIG. 2C
PRIOR ART



START

FIG. 3A
PRIOR ART